

624. Let two plates, one of amalgamated zinc and the other of platina, be placed parallel to each other (fig. 34), and introduce a drop of dilute sulphuric acid,  $y$ , between them at one end: there will be no sensible chemical action at that spot unless the two plates are connected somewhere else, as at P Z, by a body

Fig. 34«

capable of conducting electricity. If that body be a metal or certain forms of carbon, then the current passes, and, as it circulates through the fluid at  $y$ , decomposition ensues.

625. Then remove the acid from  $y$ , and introduce a drop of the solution of iodide of potassium at  $x$  (fig. 35). Exactly the same set of effects occur, except that when the metallic communication is made at P Z, the electric current is in the opposite direction to what it was before, as is indicated by the arrows, which show the courses of the currents (403).

Fig. 35-

Z

Fig. 36.

626. Now *both* the solutions used are conductors, but the conduction in them is essentially connected with decomposition (593) in a certain constant order, and therefore the appearance of the elements in certain places *shows* in what direction a current has passed when the solutions are thus employed. Moreover, we find that when they are used at opposite ends of the plates, as in the last two experiments (624, 625), metallic contact being allowed at the other extremities, the currents

are in opposite directions. We have evidently, therefore, the power of opposing the actions of the two fluids simultaneously to each other at the opposite ends of the plates, using each one as a conductor for the discharge of the current of electricity, which the other tends to generate; in fact, substituting them for metallic contact, and combining both experiments into one (fig. 36). Under these circumstances, there is an opposition of forces: the fluid, which brings into play the stronger set of chemical affinities for the zinc (being the dilute acid), overcomes the force of the other, and determines the formation and direction of the electric current; not merely making that current pass through the weaker liquid, but actually reversing the tendency which the elements of the latter have in relation to the zinc and platina if not thus counteracted, and forcing them